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| **Problem:**  Ill-structured Problem  Goals:  Fractional parts of groups  Fractional Parts of wholes | **Theory/Mode**  Case-Based Learning  Realistic/Real world case centered learning |  |  | **Design Decision**  DD1: Provide representative case with multiple educational value multiple challenges in rich contexts | **Design Results**  DR1: Representative video demonstrating how to find fractional parts using models |
| Inert Knowledge:  Fractions are equal parts of a whole or group  Time issues/  Efficiency  Learners access at their convenience | Guided Inquiry for Case analysis and reflection | **Cognitive Apprenticeship** | DD2: Organize learning experiences according to critical decision points | DR2: Small cases for each decision point in the process of applying concepts of fractional parts-Key point selecting appropriate strategies |
| Modeling |
| Coaching |
| Scaffolding | DD3: Provide cognitive modelling of an expert’s naturalistic decision making process | DR3: An expert’s reasoning video modeling selecting strategies to apply fractional parts concept understanding |
| Articulation |
| Reflection |
| Exploration | DD4: Provide cognitive scaffolding of expert’s decision making process | DR4: Guided summary notes-questions to guide notes about how to apply fraction concepts |
| **Cognitive Flexibility** |
| Crossroad Cases | DD5: Provide just-in-time learning | DR5: Information on demand-index knowledge information on fractional parts |
| Multiple conceptual Themes |
| Many Mini cases | DD6:Addition mini cases for each decision point to promote cognitive flexibility | DR6: Multiple real world fractional story problems for each decision point |
| Multiple Perspectives on cases |
|  | Implementation Decision: Promoting verbalization of fractional parts concept understanding through reflection and discussion | |
| Just-in-time learning | |  | |